

courts, a feeling which has possibly extended to art work in the precious metals and has had the effect of checking its dispersal.

The problems of the origin and affinities of this school of art work have not been fully dealt with by the author, and the material available is scarcely sufficient to form the basis of a comprehensive examination. The Peninsula is inhabited by a very mixed population, and it has been the meeting-ground of more than one ancient civilisation. Of these the most powerful is clearly China, which now supplies numerous emigrants who form an important ethnical element. To the west lies India, to the east Java and Siam. Probably all these have contributed something to the general stock of form and design. But in addition there is undoubtedly much that is indigenous.

As regards decoration, we find nothing which can be traced to architectural forms, and little which is specially religious. The introduction of Islam, which places a rigid taboo on delineation of the human form, has had far-reaching effects, and the motifs have necessarily been largely drawn from local vegetable life. These, again, have undergone considerable modification, partly resulting from the natural tendency in all such art to become conventional, and partly under direct Chinese pressure. The lotus design which frequently appears in the patterns, may have come from either China or India, and further study of the ornamentation will probably show that more has come from India than Mr. Ling Roth is at present prepared to admit.

The examples which he illustrates are chiefly small objects—boxes for holding tobacco, betel, lime, salves, or unguents, bowls and saucers, and the curious end-pieces attached to pillows, which, like many of the other objects, are ostentatiously paraded at wedding processions (Fig. 1).

The methods of manufacture, which are fully described by Mr. L. Wray, represent what is known in European art as repoussé, a thin plate of silver being placed on a lump of softened gum-resin and worked from the back by a series of punches. Graving is little used, and the results attained show considerable artistic skill. As is usual in Oriental art, the craftsman uses no fixed design and much is due to his taste and invention.

This book may be safely recommended to students of Oriental metal work, and to art classes, particularly at centres where the study of silver and gold plate is specialised, and designers in other branches of art productions may find useful suggestions in the excellent photographs with which it is illustrated.

NOTES.

IN *The Daily Mail* of Monday last, Sir Ernest Shackleton made an urgent appeal to the British nation on behalf of the Australasian Antarctic Expedition, which, it is hoped, will start in June under the command of Dr. Douglas Mawson. In his letter Sir Ernest Shackleton points out that Australasia has done much for south polar expeditions which have started from this country, and he asks for help, "from this side of the line and from Australians and New Zealanders who are gathering in London for the Coronation," towards the sum of 12,000, needed to purchase a suitable ship, which has been selected by Dr. Mawson, and to enable the expedition to start in June. The Royal Geographical Society has already subscribed 500*l.*, as in the case of Captain Scott's expedition, and a committee has been formed in Australia to assist the explorers. As the result of the appeal, and the steps taken by *The Daily Mail* to bring it under the notice of

people interested in exploration, the sum of nearly 900*l.* had been subscribed by Wednesday morning, and there is little doubt that the whole amount required will be provided. Dr. Mawson proposes to take a monoplane with him for use during the expedition.

A COMMITTEE of the Geological Society has been formed to secure the means of providing a memorial to the late Prof. T. Rupert Jones, F.R.S., in aid of his widow and daughters. The late Prof. Jones was never in receipt of more than a very moderate income, and receiving only a small pension upon his retirement thirty years ago from the post of professor of geology in the Royal Military College, Sandhurst, he was unable to make any suitable provision for his family at his death, when his pension ceased. During his long life Prof. Jones was an ardent geologist and palaeontologist, and the author of nearly 200 separate papers or other works, some of which were mentioned in our obituary notice published in *NATURE* for April 27 (p. 287). Subscriptions towards the proposed memorial may be sent to Prof. W. W. Watts, F.R.S., president of the Geological Society, Hillside, Langley Park, Sutton, Surrey, who has consented to act as treasurer to the fund. It is to be hoped that the committee's appeal will meet with a ready and generous response.

THE council of the Pharmaceutical Society has elected the following honorary members in recognition of their distinguished scientific work:—Prof. W. E. Dixon, F.R.S., professor of pharmacology, King's College, London; Dr. Adolph Engler, director, Botanical Museum, Berlin; Prof. Percy F. Frankland, F.R.S., president of the Chemical Society; M. Eugène Léger, late president Société de Pharmacie de Paris; pharmacien en Chef de l'Hôpital St. Louis, Paris; Lieut.-Colonel D. Prain, C.I.E., F.R.S., director of Royal Gardens, Kew; and Dr. Ludwig Radlkofer, professor of botany, University of Munich.

ON Tuesday next, May 16, Prof. F. W. Mott will begin a course of two lectures at the Royal Institution on "The Brain and the Hand"; on May 18 Dr. W. N. Shaw will deliver the first of two lectures on "Air and the Flying Machine": (1) "The Structure of the Atmosphere and the Texture of Air Currents," (2) "Conditions of Safety for Floaters and Fliers"; and on Saturday, May 20, Mr. W. P. Pycraft will commence a course of two lectures on "Phases of Bird Life": (1) "Flight," (2) "Migration." The Friday evening discourse on May 19 will be delivered by Prof. R. W. Wood on "Recent Experiments with Invisible Light," and on May 26 by Prof. Gilbert Murray on "The Greek Chorus as an Art Form."

THE provisional programme of the International Congress in Naval Architecture and Marine Engineering, to be held in connection with the jubilee of the Institution of Naval Architects in July, has been issued. On Monday, July 3, there will be a reception at the Royal United Service Institution. On Tuesday, July 4, the International Congress will be opened by H.R.H. the Duke of Connaught, K.G. The three following days, July 5, 6, and 7, will be devoted to the reading and discussion of papers contributed by Admiral Sir Cyprian Bridge, G.C.B., Sir Andrew Noble, Bart., K.C.B., Sir William H. White, K.C.B., Sir Philip Watts, K.C.B., the Hon. C. A. Parsons, C.B., Mr. S. W. Barnaby, Dr. S. J. P. Thearle, Mr. C. E. Ellis, Colonel G. Russo (*Italy*), Admiral Kondo, (*Japan*), Mr. Uchida (*Japan*), Count Shiba (*Japan*), Prof. Terano (*Japan*), Konsul Dr. O. Schlick (*Germany*),

Geheimrat Prof. Flamm (*Germany*), Prof. A. Rateau (*France*), and Mr. J. Johnson (*Sweden*). On Thursday, July 6, there will be a visit to the National Physical Laboratory to inspect the national experimental tank, and in the evening a banquet to the delegates and representatives.

THE death, at a very advanced age, of Miss C. C. Hopley, daughter of the late Mr. E. Hopley, of Lewes, a naval surgeon, has been recently announced. As regards natural history, the deceased lady, who took special interest in reptiles, of which she kept various specimens as pets, was best known as the author of a popular work on snakes, published in 1882. American birds likewise attracted her attention, and during the Civil War, when she was travelling to collect materials for a work on this subject, she was arrested and imprisoned as a British spy. Miss Hopley was for a number of years a contributor to *The Globe*, many natural history articles in that journal having been apparently written by her pen.

THE authorities of the British Museum are to be congratulated on having acquired, at an almost nominal price, the valuable collection of specimens illustrating the religion of Polynesia, which was long in the possession of the London Mission Society. Many of the specimens are unique, and it would now be quite impossible to form such a collection. Among the most remarkable objects are the great tapering idol of the national god of Rarotonga, kept swathed in blue and white matting; Tangaroa, the supreme god of Polynesia, a wooden figure with small human-like objects sprouting from his eyes, mouth, and other parts of his body, typifying his creative power; and a head-dress of black feathers, which completes a mourning costume already owned by the museum. It would have been nothing short of a calamity if a collection of this kind had been dispersed, and the council of the London Mission Society, which has for some time entrusted the objects to the British Museum for exhibition, is to be commended for its liberality in transferring the collection to the nation.

IN reference to the proposal to appropriate a large portion of the ground at the back of the Natural History Museum to purposes other than those of that institution, it is pointed out in the April number of *The Museums Journal* that the Government does not appear to realise the imperative need for expansion which must occur at no distant date if the museum is to do its work properly and keep abreast of the times. Such expansion, it is added, will by no means be confined to galleries and rooms for the exhibition and storage of specimens, but must embrace rooms and buildings in which scientific work in connection with the collections is carried on. Indeed, this latter item will probably be found to be the more urgent of the two. "Nowadays, any museum worthy of the name requires libraries, laboratories, workshops, studios, and so forth, and these often occupy a larger area than the exhibited collections of the museum. The ground that lies between the Natural History Museum and the Science Museum might very well prove none too large for either of these museums alone."

APROPOS of the article on "Standard Bread" which appeared in the last issue of *NATURE*, Dr. Leonard Hill, F.R.S., publishes a note in *The British Medical Journal* of May 6 on the nutritive value of white and of standard bread. Young tame rats were fed for three weeks some on white and some on standard bread, and for a second three weeks some on white and some on standard flour.

NO. 2167, VOL. 86]

Two lots of twenty-five rats each were used and kept in identical conditions; at the start the total weight of each lot was approximately the same. The results were astonishing; ten of the white flour and bread lot died against five of the standard. Taking fifteen survivors of each lot, the standard has a percentage gain in weight of $27\frac{1}{2}$, against twelve for the white in the last three weeks, and at the end nearly all the latter are losing weight, and are less lively and less sleek than the standard. Another lot fed on white flour *plus* an addition of the germ equivalent to that in standard flour, have done as well as on standard flour and bread, suggesting that the germ contains bodies essential for growth or activating enzymes engaged in the digestion of wheat proteins.

IN the House of Commons on May 3, Mr. E. Edwards asked the Secretary of State for the Home Department whether any arrangements were being made to continue the experiments with coal dust which had been carried on during the last three years by representatives of the coal owners and others at Alton Colliery and elsewhere; and whether the Government were prepared to undertake the control and responsibility of the experiments, in view of their great importance to the mining population in the direction of the prevention of coal-dust explosions. In reply, Mr. Churchill stated that it has been decided to continue the experiments referred to under the supervision of the Home Office, and that the Treasury has sanctioned the considerable expenditure that will be necessary for the purpose. The Mining Association has offered to place at the disposal of the Government for the purposes of the experiments the plant and instrument now in use at Alton, an offer which has been accepted, and arrangements are being made for starting work as soon as possible on a new site. Mr. Churchill has appointed an expert committee to be directly in charge of the experiments, the members being Sir Henry Cunynghame, K.C.B., Mr. R. A. S. Redmayne, Captain Desborough, Prof. H. B. Dixon, F.R.S., and Mr. W. Cuthbert Blackett. He has also requested the members of the Royal Commission on Mines and of the Coal Dust Committee of the Mining Association, under whose supervision the previous series of experiments was conducted, to act as a consultative committee in connection with the experiments.

MR. J. A. J. DE VILLIERS described the foundation and development of British Guiana before the Royal Geographical Society on May 8. Starting with the first settlement in the early part of the seventeenth century, he traced the gradual growth and development of the colony in the hands of the Dutch for some two hundred years. From 1803 the country became British property, and in 1834 Robert Schomburgk, who had been sent out by the Royal Geographical Society, commenced his travels and explorations which enabled him to lay down boundaries provisional at that time, but which were substantially followed and accepted by the arbitration tribunal in Paris in 1899. The whole subject is an interesting and instructive contribution to colonial history.

MISS Olive MacLeod, who, with Mr. and Mrs. P. A. Talbot, has been exploring the country round Lake Chad for several months, returned to England on Tuesday. The expedition passed up the Niger and Benue Rivers by steamer and canoes through Southern and Northern Nigeria, and then traversed the North Kamerun. French Ubangi was reached in October last. A splendid reception was accorded to the party by the Lamido at Lere. The mysterious falls on the Mao Kahi were located, and have been named Les Chutes MacLeod. After mapping this

part of the river, the party went through the Tuburi Lakes and down the Logone to Fort Lamy. The expedition then proceeded down the Shari to Lake Chad, which was crossed, in Kotoko canoes, from the Shari to Saiyorum. Close studies were made of the various peoples visited, especially of the little-known tribes of French Central Africa and the Baduma of Lake Chad. A large collection of objects of ethnological interest was made, especially of musical instruments, while typical examples of music were taken down. A botanical collection of several thousand specimens has been sent to the British Museum, as also a number of birds, beasts, and reptiles. A route-sketch was made across Lake Chad, and a survey by plane-table and theodolite from Maifoni to Kano.

IN a curious paper contributed to the *Journal of the Royal Society of Arts* for April 21, Prof. H. Chatley discusses Chinese natural philosophy and magic. He endeavours to trace a close analogy between the system advocated by the sage Ch'u Hsi, who lived in the twelfth century of our era, and the discoveries of Sir W. Crookes and Sir J. J. Thomson. Discussing the part played by gambling in magic, he remarks:—"The use of cards is said to be derived from the Turot cards, which were originally employed for occult purposes. The legend which ascribes the invention of cards to the purpose of amusing a mad king does not seem at all a sufficient explanation, and there is, in addition, the fact that cards of a kind existed before the said king. In further support of this idea, the well-known practice of telling fortunes by cards may probably be regarded as a survival of a regular form of divination by such means. It seems, in fact, that card-playing for stakes is a mere development of a ceremony in which individuals consulting the oracle decided to abide by its pronouncements as to the holding of disputed property."

MR. DEAN C. WORCESTER, Secretary of the Interior under the Government of the Philippine Islands, in an interesting and well-illustrated article contributed to the March issue of *The National Geographic Magazine*, describes the methods by which the American authorities have succeeded in gaining control over, and to some extent civilising, the pagan tribes of northern Luzon. During his tour the officer in charge of the district collects representatives of tribes which are normally in a state of war, and secures peace and the cessation of head-hunting by promoting athletic contests, which are most popular among these savages. They are encouraged to compete in their tribal dances, and the games most popular are running, wrestling, the tug-of-war, and climbing the greased pole. He thus sums up the results of this policy:—"We have been able to get results in dealing with wild men by following the simple policy of always giving them a square deal; by not punishing them for a given course of action unless they had had ample warning that such action would be followed by punishment; by never failing to punish them when, *after due warning*, they have misbehaved; by making friends with them again whenever they were ready to be friendly; and by finding an outlet for their superabundant animal spirits in rough but innocent field sports."

THE second number of the *Annals of the Cyprus Natural History Society*, for 1910, contains a short summary of the more interesting animals observed in the island during the year. A list of Cyprus birds (290 spp.) was published in the first number, and it is proposed to issue shortly lists of the mammals and Lepidoptera.

NO. 2167, VOL. 86]

ACCORDING to the Indian *Pioneer Mail*, the Bombay Natural History Society is appealing for a sum of 2000, with the object of starting a zoological survey of British India. At present about 8000 rupees have been subscribed, and with this in hand the society has started one collector; but as the services of Mr. Shortridge, who was recently invalided home from New Guinea, are available, it is desired that these should be secured, although this cannot be done without a large increase in the subscription list. It is pointed out that a brief glance at Blanford's "Mammals of India" will show how much remains to be done even in that section of the zoology of the country. Later information states that the sum promised has reached about 10,000 rupees.

IN vol. vi., part i., of the *Records of the British Museum*, Dr. Annandale describes a cirriped of the parasitic group Rhizocephala taken on a crab, *Sesarma thelxinoe*, from a stream 700 feet above sea-level in the Andamans, near Port Blair. The specimen, which is believed to be the only example of the group hitherto obtained from fresh water, is made the type of a new genus and species, under the name of *Sesarmaxenos monticola*. It is pointed out that the crab on which the parasite was found belongs to a group the members of which usually breed in brackish water, if not in the sea, and it is therefore possible that the Andamanese species may periodically visit the ocean to spawn, and that the parasite may have become attached to the type specimen during such a sojourn. "Nevertheless, the fact that the latter contains larvae in the brood-pouch while living at an altitude of 700 feet entitles it to be included in the fauna of the Indian Empire, and suggests that it is able to flourish in jungle-streams, even if it also occurs in the sea."

IN an article contributed to the May number of *Cassell's Magazine*, entitled "The Vandalism of Collectors," Mr. S. L. Bensusan directs attention to the evil effects on the British fauna produced by the recent expansion of nature-study. For it is pointed out that a considerable proportion of those who cultivate this pursuit are not content with acting the part of observers, but join the ranks of regular collectors. This entails a large destruction of birds and their eggs (probably to a great extent illegal), as well as a prodigious slaughter of butterflies and moths, to say nothing of the reckless uprooting of wild flowers. Game-preservers and game-keepers also receive a share of blame, although it is admitted that the latter are worse than the former. In conclusion, the author observes that it would have been better for the wild life of the country if the cult of nature-study had developed side by side with a fuller recognition of the claim of the wild fauna and flora to protection, or with definite legal restrictions on the taking of specimens for private purposes.

AT the conclusion of his presidential address to the Quekett Microscopical Club, on some problems of evolution in the simplest forms of life, as reported in the *Journal of that body* for April, Prof. E. A. Minchin expressed the opinion that in the case of the *Protista* syngamy is the factor which checks variation among individuals exposed to slightly different external conditions. With such restraining influence a species would tend to break up into different races and strains, either as the result of varying environment or from an innate tendency to divergence. Syngamy, on the other hand, tends to reduce individual differences to a common level. If this be correct, and if it be also true that there is no syngamy among them, it follows that real species do not exist among bacteria, the

members of which must be regarded as strains, without the stability of a species, and liable to modification in any direction by environmental influence. Hence he thinks it "evident that the passage from the bacterial to the cellular grade was perhaps the most important advance in the evolution of living beings. The acquisition of the cellular type of structure was the starting-point for the evolution, not only of the higher groups of the Protista, such as the Protozoa and unicellular plants, but through them of the whole visible everyday world of animals and plants, in all of which the cell is the unit of structure, and which consist primarily of aggregates of cells."

MR. A. R. NICHOLS records (Fisheries Ireland Sci. Invest., 1910, i.) 101 species of Polyzoa from the coast of Ireland, twenty-three of which have not been recorded previously from that coast, and six are apparently new to the British list. Mr. W. M. Tattersall (ii.) describes and figures, from the north-east Atlantic slope, six species of Mysidæ, of which a preliminary diagnosis only had been published, and also defines two new species and two new genera. Four bottom-living species are added to the British and Irish list, two of which were known previously only from the west coast of Greenland. Mr. R. Southern (iii.) contributes observations on certain pelagic Polychæta of the coasts of Ireland, and records *Vanadis formosa*, *Greeria celox*, *Callizona* (three species), *Tomopteris* (four species), *Travisiopsis* (two species), and *Sagittella* (two species), all of which, except two of the species of *Tomopteris*, do not appear to have been previously recorded from the British marine area. All these pelagic species live in warm and comparatively highly saline waters of the European branch of the Gulf Stream drift, and are carried therein towards the west coast of Ireland, but only rarely do they cross the 200-fathom line.

THE *procès-verbaux* of the council and sections of the International Marine Investigations, the meetings of which were held in Copenhagen at the end of September last, contain interesting references to observations completed and in progress. Prof. D'Arcy Thompson criticised the investigations on the age and growth of herring as determined from the scales, holding that the number of rings exhibited was subject to individual variation, and did not necessarily give a correct determination of the age of the fish. Prof. Heincke maintained that the method of age-determination by the scale-rings was scientifically sound, and Dr. Hjort stated the reasons for his belief in the trustworthiness of this method, remarking that herring examined in all months of the year showed rings which varied exactly according to the time of the year. Dr. Heincke contributed a summary of the present condition of certain aspects of the investigations on plaice. The spawning conditions of plaice are now well known, various more or less separated spawning places having been found in the southern and northern North Sea, the Kattegat, the Belt, and the Baltic, closely correlated with which are different local races, of which six or seven are distinguished, namely, those associated with the regions just mentioned and others with Iceland and the Barents Sea. Those of the Baltic and Barents Sea are slow-growing races, while those of the North Sea and Iceland are quick-growing races. The recognition of these differences is of great importance in connection with the questions of over-fishing and the plaice-production of different regions of the sea.

PRESENTING in the *Bulletin du Jardin Impérial Botanique*, St. Petersburg (vol. xi., part i.), a list of fungi collected within the government of Samara, Mr. N. N. Voronichin comments upon a new species of *Physalospora*

NO. 2167, VOL. 86]

taken on fruits of *Caragana* and certain allied species that grow parasitically on species of *Astragalus*.

ON account of the marked sensitivity of the apex of the coleoptile or first green leaf, oat seedlings are frequently employed for heliotropic experiments, and it has been stated that an incision made in the coleoptile, whatever its orientation, does not prevent the transmission of a stimulus. While offering evidence modifying this statement to the extent that an incision on the posterior side may inhibit the transmission, Mr. P. B. Jensen describes experiments in the *Bulletin de l'Académie Royale des Sciences et les Lettres de Danemark* (No. 1) in which he cut right through the coleoptile, replaced it, and then obtained proof of transmission in the case of stimuli induced by light and also by gravity.

FOREST Bulletin No. 1 of 1911, issued by the Government of India, gives an account of tests of the calorific values of fifty-six specimens of Indian woods carried out by Mr. Puran Singh, Forest Chemist to the Government. The Lewis Thomson calorimeter was used, one kilogram of the wood being burnt in oxygen. The results for thoroughly dried woods lie between 4000 and 5000 kilogram calories per kilogram of wood for the whole of the samples tested. For air-dried wood, which contains about 15 per cent. of water, the calorific power lies between 3500 and 4300 kilogram calories per kilogram of wood. Charcoal prepared from the woods has an average power of 7000 kilogram calories per kilogram.

SYSTEMATIC articles in the *Kew Bulletin* (No. 3) consist of a long series of diagnoses of new tropical African species of *Loranthus* already enumerated in the "Flora of Tropical Africa," a note on *Spatholirion* by Mr. S. T. Dunn, and a critical opinion by Mr. T. A. Sprague on the exact status of two saxifrages known as *lingulata* and *lantoscana*, according to which the latter should be regarded merely as a variety of the former. A notable instance of invasion of our southern shores by an alien brown alga, *Colpomenia sinuosa*, is described by Mr. A. D. Cotton. The alga thrives best in sheltered situations, and makes its growth principally in the autumn; persisting through the winter, it produces spores in spring and disappears in summer. On the authority of Lieut.-Colonel A. F. Appleton, a discrimination of the ordinary Transvaal grasses is provided; outside the species of *Eragrostis*, *Panicum*, and others well known, *Anthistiria imberbis* and *Chloris virgata* are recommended as fodder plants.

A GENERAL index has been issued for the Journal of the Board of Agriculture in two volumes, dealing with the two periods 1894-1904 and 1904-11. Since the Journal started in 1894, it has maintained a high standard, and has published many articles of permanent value. All these are rendered much more available, now that the general index has appeared, than they were before.

WE are in receipt of the Madras Agricultural Calendar, April, 1911, to March, 1912, issued by the Agricultural College and Research Institute, Coimbatore, containing a number of articles intended for the large and the small agriculturist. In the nature of things, the college is able to play a much more paternal part in the life of the community than would be possible elsewhere, and this publication shows clearly how very extensive are the ramifications of an Indian agricultural department.

THE seasonal distribution of egg production has formed the subject of a biometrical study by Drs. Pearl and Surface, the results of which are published in Bulletin 110

of the United States Department of Agriculture Bureau of Animal Industry. Four cycles were found in the year, the winter period, November to March, wherein egg production is essentially a non-natural (*i.e.* a forced or stimulated) process, the spring period, March to June, this being the natural laying period of the fowl, and two later periods, June to September and September to October. The third period represents in part a natural continuance of the normal breeding period, and in part a stimulated process; it is terminated by the moult, the characteristic feature of the fourth period.

THE Harper Adams Agricultural College has recently issued two reports, one dealing with the experiments carried out in the counties of Staffordshire and Shropshire. Numerous field trials are reported in various centres, dealing with the effects of the various artificial manures alone and in various admixtures on the common crops. Some of the proportions are a little difficult to understand; one of the mixtures, for instance, being composed of $1\frac{1}{2}$ cwt. of one constituent, $3\frac{1}{2}$ cwt. of another, and $1\frac{1}{2}$ cwt. of a third. Unfortunately no soil analyses are given, nor are there any meteorological data for the various centres, so that discussion of the results is not possible. At the college itself, work has been continued on the "wart" disease of potatoes caused by the fungus *Synchitrium endobioticum*, Percival, not the least interesting feature of which is that certain varieties of potato are immune, whilst others, in the same conditions, are attacked.

IN *La Géographie* (No. 3, 1911), M. N. Villate gives an account of his recent journeys from Tidikelt to the Niger by the Ahaggar, and adds to our accurate knowledge of the French Sahara. His object was to extend the network of astronomically determined positions, and he succeeded in obtaining the latitude and longitude of forty-nine points. Equal altitudes of stars were observed for latitude and chronometer correction; longitudes were obtained when practicable by occultation of stars, and chronometer watches furnished a means of determining the difference of longitude between neighbouring points on the route. Observations were also made of the magnetic declination, inclination, and horizontal force at some thirty-five to forty points from Biskra in the north to Gao on the Niger in the south. In consequence of changes which were found to have taken place in the magnetic moment of the magnets during the journey, values of the horizontal force can only be given to three places of decimals of C.G.S. units.

MISS GEORGINA KING has reprinted several newspaper articles in a pamphlet entitled "The Mineral Wealth of New South Wales and other Lands and Countries" (Sydney: Brooks and Co.), with some additional matter and a personal introduction. Her main contention is that the ore-deposits were connected with volcanic activity, which was especially prevalent in Tertiary times. Man, however, is said to have existed in Australia in "the early Tertiary period," and to have acquired a wandering propensity from the mental shocks then received. *Glossopteris* is said to be in Europe exclusively a Mesozoic plant. Waterspouts over oceans are attributed to "upheavals of subsided metamorphic matter." We can understand the writer's assertion that geologists in Australia have objected to the publication of such papers in scientific journals; but we can scarcely believe, as is alleged, that their motive was a fervent desire to issue the results under their own names.

NO. 2167, VOL. 86]

THE Italian Seismological Society has issued a volume of notices of the earthquakes observed in Italy during the year 1907. The volume is compiled by Dr. G. Martinelli, assistant in the R. Ufficio Centrale di Meteorologia e Geodinamico at Rome, and forms the appendix to the fourteenth volume (for 1910) of the *Bollettino* of the Seismological Society. Twenty years ago, such notices were contained in a few sheets of the *Bollettino Meteorico* of the central office. When the Seismological Society was founded in 1895, they were issued in detachments with each part of the *Bollettino*. Published, as they now are for the first time, in a separate volume of nearly six hundred pages, we can form some idea of the magnitude and value of the work, for the editing of which Dr. Martinelli is responsible. Among the most interesting of the notices are those on the Calabrian earthquake of October 23, 1907. These form the foundation of the report that will shortly be issued by the Government Commission on this violent, if somewhat restricted, shock.

THE monthly meteorological chart of the North Atlantic, published by the Meteorological Committee for May (first issue), includes useful synoptic weather charts of that ocean for April 6-12 (commencing with the day following the blizzard experienced in this country). They show that during nearly the whole of the period in question there was an area of high barometric pressure outside our north and north-west coasts, and that it extended at times to the mid-Atlantic. This distribution of pressure explains the severe weather over England and France, which was accompanied by frequent showers of snow and sleet. As the central part of the anticyclone extended southward the weather became finer. The chart of the Indian Ocean for the same month contains an interesting communication on phosphorescent seas from Admiral Tydeman, of the R. Netherlands Navy (see NATURE, March 16). We note that the chart has been further improved, and extended to the eastward.

A NEW method of producing the line spectra of a metal, which promises to facilitate greatly the study of the subject, is described by Dr. G. Gehlhoff in the *Verhandlungen* of the German Physical Society for March 30. It makes use of the fact that the inactive gases, helium, argon, &c., are spectroscopically extremely sensitive to impurities, their lines disappearing from the positive glow of the vacuum tube if small quantities of air or water vapour are present. A small quantity of the purified metal to be investigated is introduced into one of the ordinary spectral tubes, and the tube washed out with, and finally filled with, helium. On passing the discharge the tube may or may not give the lines of the metal in the positive glow, but on heating it, a temperature can always be found at which the lines appear, and a higher temperature at which the helium lines disappear completely. These temperatures are respectively, for caesium, 50° and 70° C.; for sodium and potassium, 80° and 140° C.; while for mercury the temperature of the room is sufficient to produce the lines of the metal.

THE March number of the *Bulletin de la Société d'Encouragement pour l'Industrie Nationale* contains the first instalment of a lecture on the electrification of railways, delivered before the society in November last by M. de Valbreuze. After giving a short history of the slow progress of electrification previous to 1905, and its rapid extension since that date, the author describes the principal features of the systems at present in use under the heads:—Direct current 500-700 volt systems, triphase systems, monophase systems, and direct current high-pressure

systems. As the article is well illustrated and deals to a large extent with installations less well known in this country, it will prove of great value to those who wish to get a bird's-eye view of the present state of the problem of electrification of railways. Subsequent articles will deal more in detail with the conditions under which electric traction is advantageous, and the relative merits of the various systems.

WE learn from an illustrated article in *The Engineer* for April 28 that the 9,000,000-gallon water tank, constructed by Messrs. Clayton, Son and Co., of Leeds, for the water supply of Calcutta, is now finished. This tank is 321 feet square and is 16 feet in depth. The height from the top of the tank to ground level is 110 feet; the tank is supported by a large number of braced steel columns. The tank is divided into four compartments by cross frames, each of which can be used independently, so that one or more compartments can be put out of service for cleaning or repairs without interrupting the service from the others. The tank is constructed of steel plates $\frac{3}{8}$ inch in thickness and is thoroughly stiffened. The tank is roofed in, the roof overhanging the tank by 12 inches. Plates and brass wire gauze are fitted in order to prevent birds, &c., from gaining access to the tank. The tank had to be made absolutely watertight by the terms of the contract, and this has been carried out successfully.

THE Cambridge University Press has published separately, price 3s., the exercises from Dr. C. Davison's "Algebra for Secondary Schools," which was reviewed in NATURE on November 19, 1908 (vol. lxxix., p. 65).

MESSRS. WITHERBY AND CO. have in the press and will shortly publish an illustrated travel book, entitled "Through South Westland," by Miss A. M. Moreland, being a chronicle of a ride through a district in New Zealand which is little known to the outside world.

THE latest ornithological catalogue of Messrs. John Wheldon and Co., 38 Great Queen Street, London, W.C., which has been received, is conveniently arranged under countries. It includes particulars of the books from the library of an eminent ornithologist lately deceased, and selections from several other important libraries. The catalogue gives details of 1450 books and papers.

THE Royal Insurance Company, Ltd., of Liverpool, has issued the eighth edition of "Records of Sports." Among its new features may be mentioned the section dealing with aviation, which provides full information, up to the end of 1910, of notable performances and other events in connection with aviation. The details provided in connection with many sports have been greatly amplified. Copies of this interesting book of reference may be obtained, so long as the supply lasts, by applying to the manager of the company at 1 North John Street, Liverpool.

ERRATUM.—In the abstract of a paper read before the Royal Society of Edinburgh, printed in NATURE of April 6, p. 200, second column, line 8 from bottom, the " in the formula $y^n(x+a)$ was omitted. The formula was printed exactly as it was in the type-written copy supplied by the reporter, and the error was unfortunately not noticed by him in proof.

OUR ASTRONOMICAL COLUMN.

METEORIC FIREBALLS AND METEORS.—On April 30, at 11.58 p.m., the Rev. T. E. R. Phillips, of Ashtead, Surrey, saw a fine meteor about three times as brilliant as Jupiter. It was directed from Virgo, and disappeared in $206^\circ + 14^\circ$, only the end course of about 3 degrees being observed.

NO. 2167, VOL. 86]

On May 2, at 10.53, Mr. J. H. Elgie, of Leeds, saw a fine meteor equal to Venus descending from 2° above β Serpentis to 4° above β Librae.

On May 4, at 8.52 p.m., Mr. S. A. Wilson, of Reigate, Surrey, witnessed the flight of a magnificent meteor from the Polar star to a few degrees below Capella. Its light was estimated as three times the apparent lustre of Venus. It left a long train in its wake, and moved with fairly slow speed. The radiant point was probably in the eastern sky at about $247^\circ + 2^\circ$, as there is a very active shower of bright meteors from this point in May, and the direction of the fireball of May 4 is nearly conformable with this stream.

Mr. F. T. Naish, of Bristol, watched the eastern sky on May 4, 14h. to 15h., and saw eight fairly bright meteors. Three of these were conspicuous from their streaky trains and very long flights, and they were directed from the radiant point of Halley's comet. The paths intersected at $338^\circ - 2^\circ$. The shower of Aquarids supposed to be associated with the famous comet referred to has certainly returned this year, though not in special abundance according to the reports already received.

THE TOTAL ECLIPSE OF THE SUN.—Major Hills, secretary of the Joint Permanent Eclipse Committee, has, according to *The Times* of May 5, received a telegram from Father Cortie stating that thick cirrus clouds persisted at totality, but photographs of the corona and spectrum were obtained; the corona was characteristic of the minimum sun-spot period.

A telegram received by the Astronomer Royal from Mr. Worthington, who was also stationed at Vavau, reads:—"Splendid photos. inner and outer corona, one and a half degrees."

A later communication states that Mr. C. L. Wragge, formerly meteorologist to the Queensland Government, saw the eclipse under excellent conditions at Lifuka, Friendly Islands. Hydrogen prominences were wonderfully distinct, and, apparently, a four-vaned corona was seen extending some distance from the moon's disc.

SPARK SPECTRA OF CALCIUM AND HYDROGEN IN A MAGNETIC FIELD.—Some results possibly of great importance in the study of solar physics are published by M. Hemsalech in the *Comptes rendus* for April 24 (vol. cii., No. 17, p. 1086).

M. Hemsalech finds that when a spark is passed perpendicularly to the lines of force in a strong magnetic field, the enhanced lines in the spectrum of the spark behave differently from the arc lines. When the spark passes between calcium poles, in a field of from 4000 to 6000 C.G.S., it is violently projected in a sheaf at right angles to the lines of force, and a spectroscopic examination of this sheaf shows that the line at $\lambda 4227$ is as long as H and K; the spectroscope is pointed parallel to the lines of force. When the spark is passed in a strong transverse current of air, without a magnetic field, the 4227 line is much longer than H and K.

But when the spark is passed, in the magnetic field, in an atmosphere of hydrogen, a remarkable change takes place, for whereas the respective heights of the H and K lines were 22.6 and 23.7 cm., the 4227 line was only 16.3 cm.; the heights of the hydrogen lines were $H\alpha$ 21.4, $H\beta$ 20.0, $H\gamma$ 18.8, and $H\delta$ 16.3 cm. The spark lines at $\lambda 3706$ and $\lambda 3737$, in the vicinity of the poles, are also higher than the arc lines $\lambda 4283$ and $\lambda 4455$. In an atmosphere of oxygen, however, the 4227 line is as long as H and K, and if a weaker current, 800 C.G.S., is employed, it becomes longer and stronger than they.

M. Hemsalech tentatively suggests an analogy with the solar conditions. A mass of hydrogen atoms carrying electric charges, and travelling parallel to the solar surface, might, in the magnetic field around a spot, become violently projected, as in the laboratory, and carry with it to as great or a greater height the calcium vapour so abundant in the solar atmosphere; this could not happen immediately over a spot nucleus, for there the lines of force are perpendicular to the solar surface.

THE SOLAR CONSTANT.—Messrs. Abbot and F. E. Fowle, jun., discuss the value, during recent years, of the solar constant of radiation in No. 3, vol. xxxiii., of *The Astro-*